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PROVISIONAL No.	DATE OF FILING
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PROVISIONAL SPECIFICATION

Applicant(s):

Paul Damian NELSON

Invention Title:

APPARATUS

The invention is described in the following statement:

APPARATUS

This invention relates to a support system and in particular to a bicycle seat.

5 The present invention is an improvement or modification to one of the seats disclosed in my co-pending Australian patent application no. PO4055, the contents of which is incorporated into this specification by this reference.

10 This invention may be said, in the first aspect, to reside in a support system, including;
a first support portion and a second support portion for receiving a riders buttocks; and
and a hinge for allowing each of the first and second support portions to undergo independent arcuate
15 movement having a component at least in a substantially vertical plane when the rider is seated on the support portions and performing a pedalling motion.

20 This invention may also be said, in the first aspect, to reside in a support system, including;
a first support portion and a second support portion for receiving a riders buttocks;
a front portion coupled to the first and second

support portions; and

and a hinge between the first and second support portions and the front portion for allowing each of the first and second support portions to undergo substantially independent arcuate movement having a component at least in a substantially vertical plane when the rider is seated on the support portions and performing a pedalling motion.

According to this aspect of the invention the independent arcuate movement of the support portions provides both comfort and energy return to the person when the person is seated on the support portion and performing a pedalling motion such as that performed when riding a bicycle. Furthermore because of the movement of the support portions friction is reduced which in turn reduces chaffing.

Preferably the first and second support portions are separated by a longitudinal slot. However, in other embodiments the first and second support portions could be connected by a thin longitudinal hinge member so the first and second portions are formed on a single support member and wherein the longitudinal hinge allows independent arcuate movement of the first and second support portions.

Preferably the hinge comprises a first hinge between the first support portion and the front portion and a second between the second support portion and the front portion.

Preferably the support system includes an integral shell which includes the first and second support portions, the front portion and the hinge with the hinge being defined by a transition between the support portions and the front portion.

In the embodiment of the invention where the support system includes the integral shell, the integral shell including the hinge is preferably formed from a resilient plastics material such as polycarbonate,
5 polyethylene or the like so that the first and second support portions can move in the arcuate direction by flexure of the hinge and the resilient nature of the material will cause the first and second support portions to tend to return to their initial position as load is
10 removed from them during pedalling motion.

Preferably the shell is provided with upholstery which covers the shell.

Preferably the support system has connecting means for connecting the support system to an article, the
15 connecting means being coupled to the front portion between a front end of the front portion and the hinge so as not to interfere with flexing movement of the hinge and the arcuate movement of the first and second support portions.

Preferably the connecting means comprise
20 connecting rails.

In one embodiment the connecting rails are coupled to the shell by embedding portions of the rails into the shell when the shell is formed. In other
25 embodiments the rails may be coupled to the shell by securement members which are attached to the shell or which are formed integral with the shell. In still further embodiments the rails may be formed integral with the shell.

Preferably support portions are cupped shaped for
30 receiving the ischial bone region and buttock region of a

rider.

Preferably the front portion comprises a truncated nose.

5 In one embodiment the front portion includes a soft padding to extend the length of the truncated nose. In this embodiment the soft padding merely collapses when contacted by a rider so that the front portion has the appearance of a conventional bicycle seat with an elongated nose but the front portion preforms little or no vertical
10 support function for a rider. In this embodiment, the front portion may provide some lateral support function to assist in stability and centring of the rider on the seat.

A further aspect of the invention may be said to reside in a support system including;

15 first and second support portions, the first and second support portions each having a depression for receiving the ischial regions of a persons anatomy;

a raised portion between and forward of the depressions of the first and second support portions, for
20 receiving the ramus of the ischial regions or the ischial regions of a persons anatomy;

and a nose section which extends forwardly of the support portions and which declines from the support portions towards a front end of the nose section.

25 In this aspect of the invention the support is configured so that most of the riders weight will be centred on the ischial bones and buttock region of the rider and supported in the depressions of the first and second support portions. This therefore decreases the
30 amount of compression of the users anatomy other than the vicinity of the ischial bones to increase comfort and prevent significant pressure from being applied to other

portions of the buttocks outside the ischial region.

Preferably the first and second support portions are separated by an elongated slot.

5 Preferably the first and second support portions and the front portion are integral with one another by being made as an integral shell.

Preferably the support portion includes upholstery on the shell.

10 A further aspect of the invention may be said to reside in a support system, including;

 a support portion for receiving a users buttocks;
 a truncated nose extending forwardly from the support portion;

15 a soft collapsible upholstery member provided on the nose portion for extending the nose portion forwardly and/or upwardly with respect to the support portions.

20 According to this aspect of the invention the self collapsible member on the nose portion gives the seat the appearance of a conventional bicycle seat but nevertheless performs little or no vertical support function because of the collapsibility of the material when pressure is applied to it. This reduces pressure to the soft tissue of the nose section against a user when on the support system. The soft collapsible material provides a
25 centring member so that a person can centre him or herself on the support portion relative to the truncated nose and the collapsible material and truncated nose may also provide some lateral support to assist centring and stability of a rider when seated on the support system.

The self collapsible material may be a foam or sponge material or polyethylene or the like.

5 Preferably the support portions and truncated nose are formed as a integral shell from plastics materials such as polycarbonate, polyethylene or like material.

 Preferred embodiments of the invention are described, by way of example, with reference to the accompanying drawings, in which;

10 Figure 1 is top perspective of a bicycle seat embodying the invention;

 Figure 2 is a side view of the seat of Figure 1;
 Figure 3 is a view along the line III-III of Figure 1;

15 Figure 4 is a view along the line IV-IV of Figure 1;

 Figure 5 is a view along the line V-V of Figure 1;

 Figure 6 is a view along the line VI-VI of Figure 1;

20 Figure 7 is a top perspective view of a bicycle seat according to a second embodiment of the invention;

 Figure 8 is a side view of the seat of Figure 7;

 Figure 9 is a top perspective view of a bicycle seat according to a third embodiment of the invention;

25 Figure 10 is side view of the seat of Figure 9;

Figure 11 is a view along the line XI-XI of Figure 9;

Figure 12 is a view along the line XII-XII of Figure 9;

5 Figure 13 is a view along the line XIII-XIII of Figure 9;

Figure 14 is a view along the line XIV-XIV of Figure 9;

10 Figures 15, 16, 17, 18, 19, 20, 21 and 22 are views various mounting rails for connecting the bicycle seat of the preferred embodiments to a bicycle.

15 With reference to Figures 1 and 6, a bicycle seat 10 is shown which has an integral shell 11 including first and second support portions 12 and 14 which are separated by a longitudinal slot 16. The shell 11 also has a front portion 18 which forms a nose of the seat 10 and which is integrally coupled to the support portions 12 and 14.

20 The nose 18 and support portions 12 and 14 are coupled together by first and second hinges 20 and 22 which are also integral with the nose 18 and support portions 12 and 14 and which are formed by a transition between the nose 18 and support portions 12 and 14.

25 The shell 11 may be covered by upholstery 25 (see Figures 3, 4, 5 and 6) which is formed from conventional padding material.

 In the preferred embodiment of the invention where the hinges 20 and 22 are integral with the remainder of the shell 11, the shell is formed from a flexible

material, for example, plastics material such as polycarbonate or polyethylene so that the combined effect of the slot 16 and the transition from the nose portion 18 to the support portions 12 and 14 allows flexing movement of the support portions 12 and 14 about the hinges 20 and 22 relative to the front portion 18. However, in other embodiments the hinges 20 and 22 could be formed from suitable flexible material which is connected to separate front portion 18 and support portions 12 and 14 which, in turn, are formed from rigid material. Furtherstill, in other embodiments rather than providing the slot 16 a thin narrow longitudinal hinge line (not shown) may be provided between the portions 12 and 14 so that the portions 12 and 14 are effectively formed as a single member with the portions 12 and 14 being able to move independently with respect to one another about the longitudinal hinge which joins the support portions 12 and 14.

The support portions 12 and 14 are a mirror image with respect to one another and, as will be evident from the cross-sectional views forming Figures 3 to 6, have a depression or recess 30 so that they are generally cupped shaped in configuration so as to snugly receive a portion of a riders buttocks adjacent the ischial bones. As is also apparent in Figure 2 the portions 12 and 14 incline upwardly slightly relative to the front portion 18.

The support portion 12 and 14 may also be provided on the underside of the shell 11 with a plurality of integral ribs 27 which extend from a rear end of the support portions 12 and 14 to a position rearwardly of the hinges 20 and 22 as can be clearly seen in Figures 3 and 4.

As is best seen in Figures 3 to 6 the portions 12 and 14 (only the portion 12 being shown in Figures 3 and 4) have a rim 32 which surrounds the depressions or recesses

30. The rim 32 has a downwardly curved outer edge 33. As also shown in Figure 2 a connecting rail 40 is coupled to the seat 10. The rail 40 is connected between the hinges 20 and 22 and front end 42 of the nose 18 so that the rail 40 is confined to the nose 18 and does not interfere with movement of the hinge 22 or support portions 12 and 14. Thus, when the rail 40 is coupled to a bicycle to secure the seat 10 to the bicycle (in a manner which is known) the front portion 18 is held substantially still and the support portions 12 and 14 are able to move by flexing movement of hinges 20 and 22 relative to the front portion 18.

As is best shown in Figure 4 the shell 11 may be provided with an enlarged thickness portion 50 just forward of the hinges 20 and 22 and also an enlarged thickness portion 52 at the front end 42 of the nose 18. The enlarged thickness areas 50 and 52 can provide bosses for receiving the rails 40 to secure the rails 40 to the shell 11. Preferred methods of connecting the rails 40 to the shell 11 will be described in more detail hereinafter with reference to Figures 15 to 22.

As is best shown in Figure 6 the nose 18 is preferably of inverted U-shape in cross-section and forms a raised portion 19 between the depressions or recesses 30 of the support portions 12 and 14. As best shown in Figures 3 and 4 the nose 18 is angled downwardly from the hinges 20 and 22.

When a rider is seated on the bicycle seat of Figures 1 to 6 and commences pedalling motion the movement of the buttocks of the rider during pedalling will cause general oscillating movement of the support portions 12 and 14 about hinges 20 and 22 independently of one another so that the portions 12 and 14 move in an arcuate manner as

shown by arrow A in Figure 2. The arcuate movement is mainly in a substantially vertical plane which is parallel to the longitudinal axis of the bicycle so that the arcuate movement has a major component in that vertical plane.

5 However, some lateral movement of the portions 12 and 14 may also take place as shown by arrows B in Figure 5 so that the arcuate movement also has a component in a generally vertically plane which is perpendicular to the longitudinal axis of the bicycle. Thus, the arcuate
10 movement in the vertical plane which is perpendicular to the axis of the bicycle is generally a minor component movement compared to the arcuate movement which is in the plane parallel to the longitudinal axis of the bicycle.

The arcuate movement of the support portions 12
15 and 14 provides comfortable support for the rider as the rider pedals the bicycle and also some energy return back into the users body due to the generally spring action or flexing provided by the hinges 20 and 22 which tends to return the portions 12 and 14 to their starting position as
20 the rider moves. Thus, the rider is comfortably supported in an energy sufficient manner for pedalling of the bicycle.

In the embodiments of Figures 1 to 6 the seat 10 has the appearance of a generally conventional long nosed
25 bicycle seat apart from the slot 16. If the slot 16 is covered by the upholstery material the seated embodiments of Figures 1 to 6 would, for intense purposes, look like any conventional long nosed leather bicycle seat.

The embodiment of the invention shown in Figures
30 7 and 8 has the same general appearance as the embodiment of Figures 1 to 6 and is structured identically to Figures 1 to 6 except that the front portion 18 of the shell 11 is in the form of a truncated nose 18 which is much shorter

than the nose 18 in the embodiments of Figures 1 to 6. In the embodiments of Figures 7 and 8 the upholstery 25a is much thicker in the front portion 21 of the seat 10 and effectively extends the length of the front 21 so that the front portion 21 has the same appearance as the nose 18 in Figures 1 to 6. However, the upholstery 25a which is in the vicinity of the nose 18 and extends the length of the front portion 21 in the embodiment of Figures 7 and 8 is of a very soft material such as soft foam or sponge material, "nerf" type material, polyethylene or like material so that it will readily collapse as soon as the user places any weight on it at all. Thus, the front portion 21 in embodiments of Figures 7 and 8 provides little or no support in the vertical direction and therefore reduces the pressure of the soft tissue of a rider when pedalling. The purpose of the soft upholstery portion 25a in the embodiments 7 and 8 is merely to give the appearance of a conventional seat whilst at the same time reducing the support function of the nose 18 and also therefore reduces pressure to soft tissue.

The front portion 21 in the embodiment of Figures 7 and 8 does provide some centring datum so that the rider can properly centre himself on the support portions 12 and 14 relative to the front portion 21 and also provide some lateral stability for the rider when seated on the seat and during cornering. Nevertheless, the general support provided by the front portion 21 in the embodiments of Figures 7 and 8 is intended to be considerably less than that provided in the previous embodiment and the very soft upholstery material 25a is intended to collapse when weight is applied to it so as to basically form no load bearing function thereby reducing any chaffing which the nose portion of a bicycle seat normally produces.

Apart from the inclusion of the truncated nose

section 18 and the relatively thicker yet softer upholstery material 25a in the front portion 21 the bicycle seat of Figures 7 and 8 functions in exactly the same manner as that of Figures 1 to 6.

5 Figures 9 and 10 show a third embodiment of the invention which is also similar to Figures 1 to 6 except that in this embodiment the front portion 18 is in the form of a truncated nose 18 substantially identical to that of Figures 7 and 8. However, in this embodiment the elongated
10 soft upholstery material of Figures 7 and 8 is not provided so that the seat has the appearance of a very short nosed seat as is evident from Figures 9 and 10.

 As is shown in Figures 11 to 14 upholstery material 25 is provided and generally follows the contour
15 of the shell 11 of Figures 9 and 10 similar to the upholstery 25 in Figures 1 to 6.

 In the embodiments of Figures 9 to 14 the ribs 27 run the entire length of the shell 11 from rear 55 to front end 42 and the support portion 12 and 14 are slightly wide
20 then in the embodiment of Figures 1 to 6.

 The hinges 20 and 22 at support portion 12 and 14 of the embodiment of Figures 9 to 14 operates in precisely the same manner as in the embodiment of Figures 1 to 6.

 Figures 15 to 22 show preferred ways of coupling
25 the mounting rails 40 to the shell 11 of the bicycle seat 10. In Figure 15 a plate 70 is provided and rails 40 are connected to the plate 70. The plate 70 can be bolted or glued to shell 11 or can be embedded in the shell 11
between the hinges 20 and 22 and the front 42 of the nose
30 18 during moulding of the shell 11.

Figure 16 shows a slightly different configuration of the rails 40 in which the rails 40 are formed from a single piece having a U-shaped transition 41. The ends of the rails 40 are provided with circular plates 43 which can be embedded in the shell 11 when the shell is moulded.

Figure 17 shows an embodiment similar to that shown in Figures 3 and 4 where the rails 40 have laterally projecting ends 47 which are received in the thickened portions 50. The ends 47 may be embedded in the thickened portions 50 when the shell 11 is moulded or alternatively holes may be provided in the thickened portions 50 for receiving the ends 47. The U-shaped transition 41 can be received in a slot in portion 52.

The distance between the thickened portions 50 and 52 and the size of the rails 40 may be such that when the rails 40 are located in place they are placed under slight tension to securely maintain the rails 40 in place on the shell 11.

Figure 18 shows an embodiment in which the nose 18 has moulded to it two generally cylindrical bosses 59 which are provided with holes 61 for receiving the ends 47 of the rails 40. The transition 41 of the rails may be received in slot 74 at the front 42 of the nose 18.

Figure 19 is a side view of the nose 18 and rails 40 according to the embodiment of Figure 18 more clearly showing the location of the transition portion 41 in the slot 74. In this embodiment a fastener 75 may be located through a return portion 18' of the nose 18 to securely hold the transition portion 41 of the rails 40 in place in the slot 74.

Figure 20 merely shows a different embodiment of the rail 40 wherein the rail is provided with ends 47' which are turned inwardly in the opposite direction to the direction of the ends 47 in Figures 17, 18 and 19. In this
5 embodiment the transition portion 41 is square in shape rather than U-shaped as in the earlier embodiments. The legs 47' could be embedded in the shell 11 during the moulding.

Figure 21 shows a further embodiment in which a
10 stud 80 can be embedded in the shell 11 when the shell 11 is formed. The stud 80 has a sleeve 82 having screw threads 83. Stud 80 also has a base 85 which has prongs 87 which embed in the shell 11 to securely locate the stud in place. The rails 40 are provided with screw threads 40' on
15 a free end thereof which screw into the screw threads 83 in the sleeves 82.

Figure 22 shows a further embodiment in which the rails 40 are formed integrally with the nose 18 from the same material as the nose 18. In this embodiment the rails
20 40 have integral legs 65 which extend between the rails 40 and the nose 18 to couple the rails to the shell 11.

The embodiment of figure 1 is a sleeker design for more high performance applications and may be relatively light whereas figure 9 is designed more for
25 additional lateral width for recreational purposes.

Since modifications within the spirit and scope of the invention may readily be effected by persons skilled in the art, it is to be understood that this invention is not limited to the particular embodiment described by way
30 of example hereinabove.

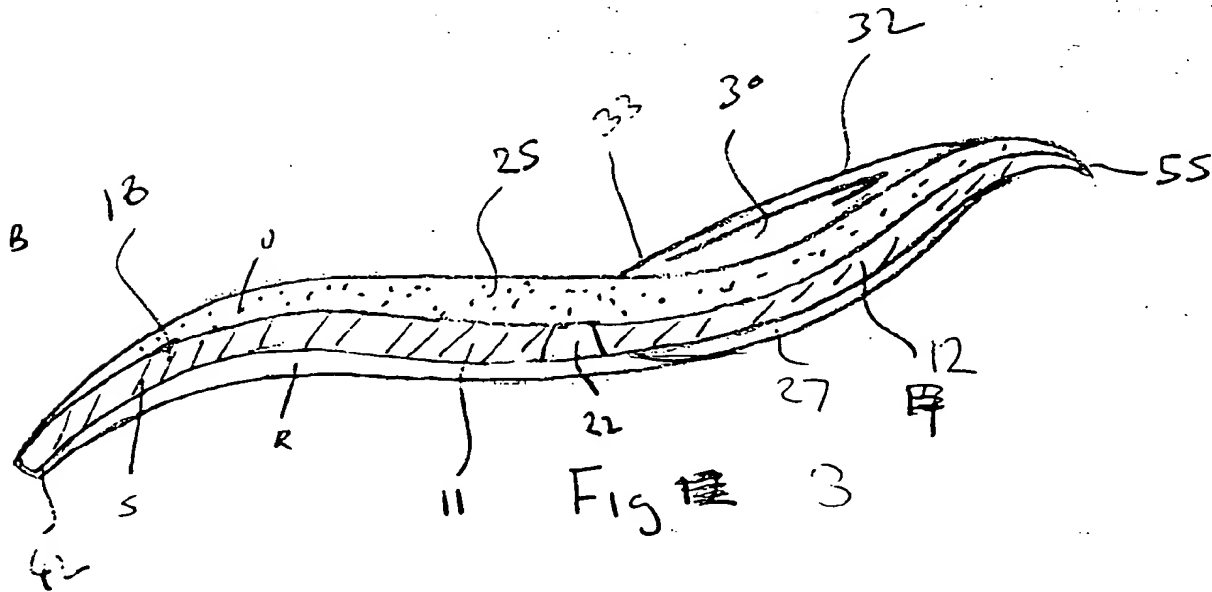
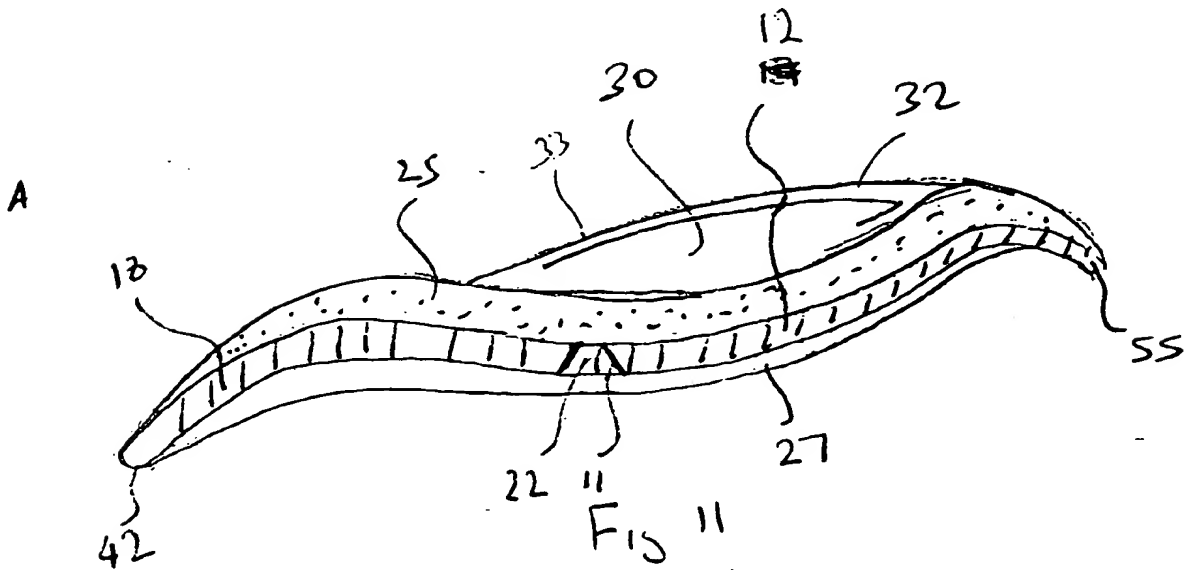
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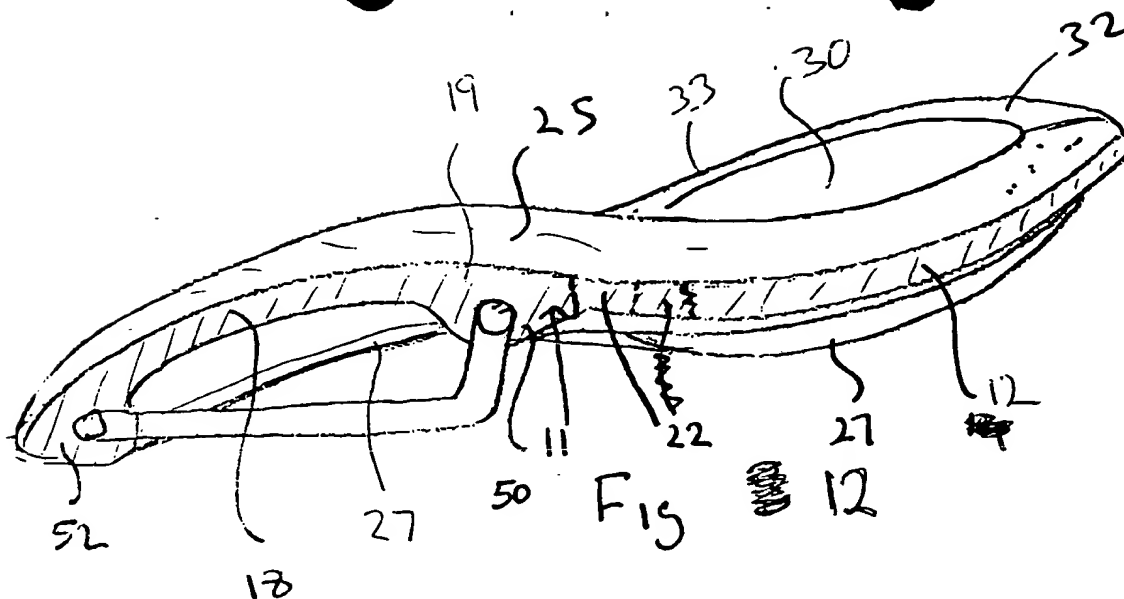
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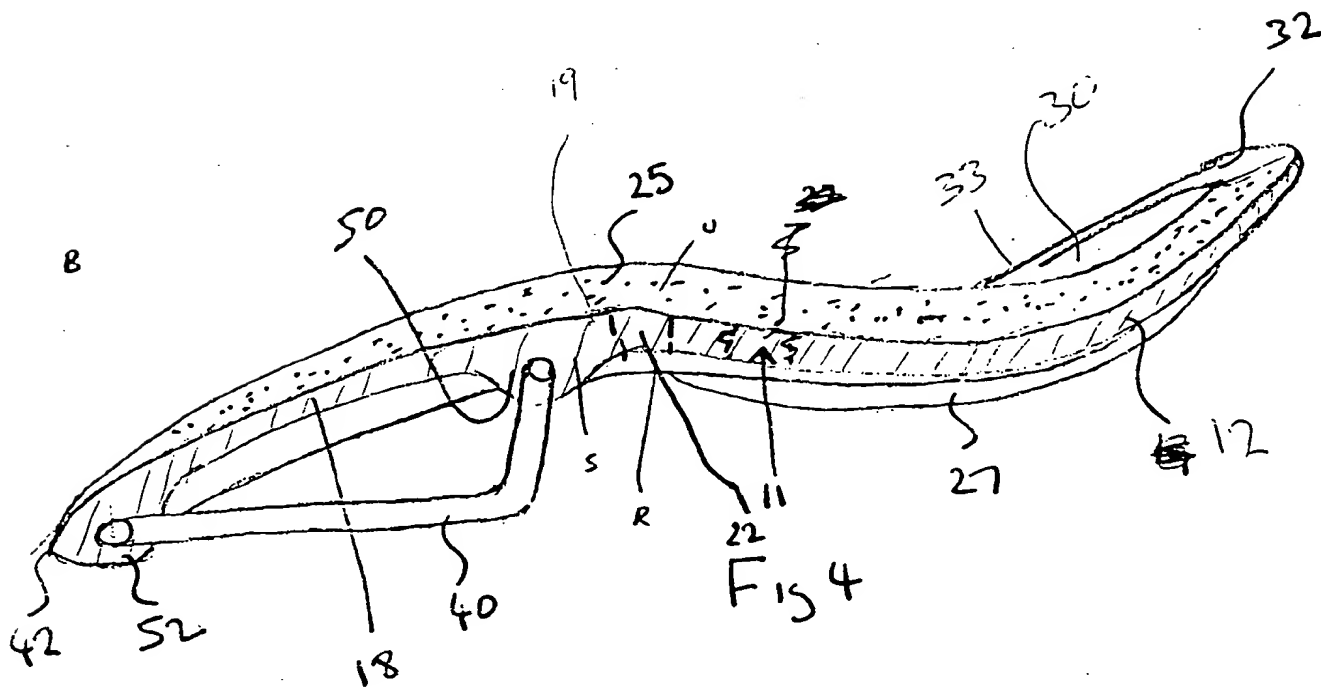
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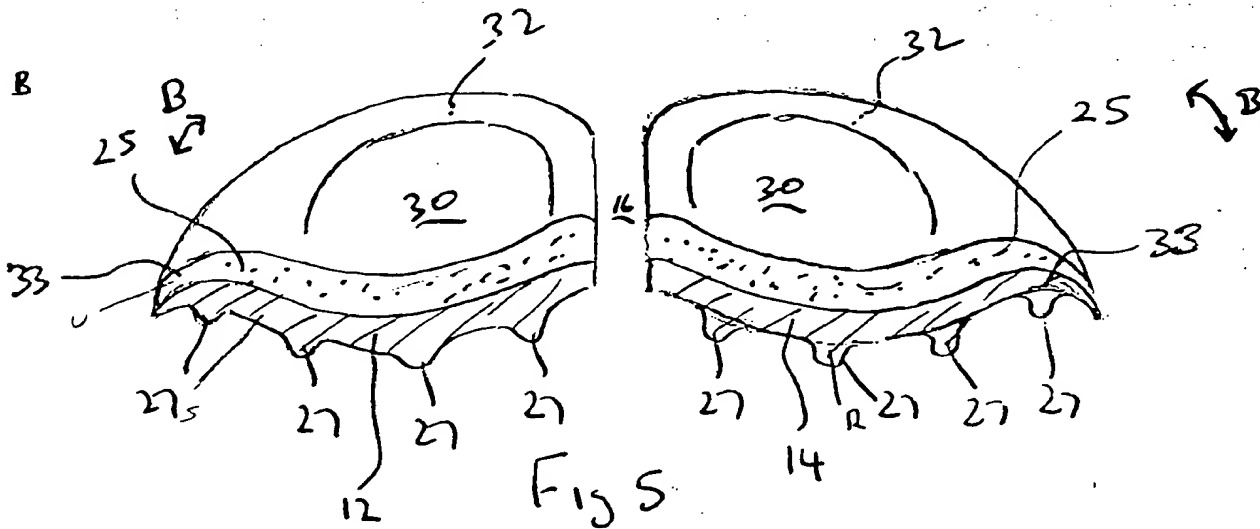
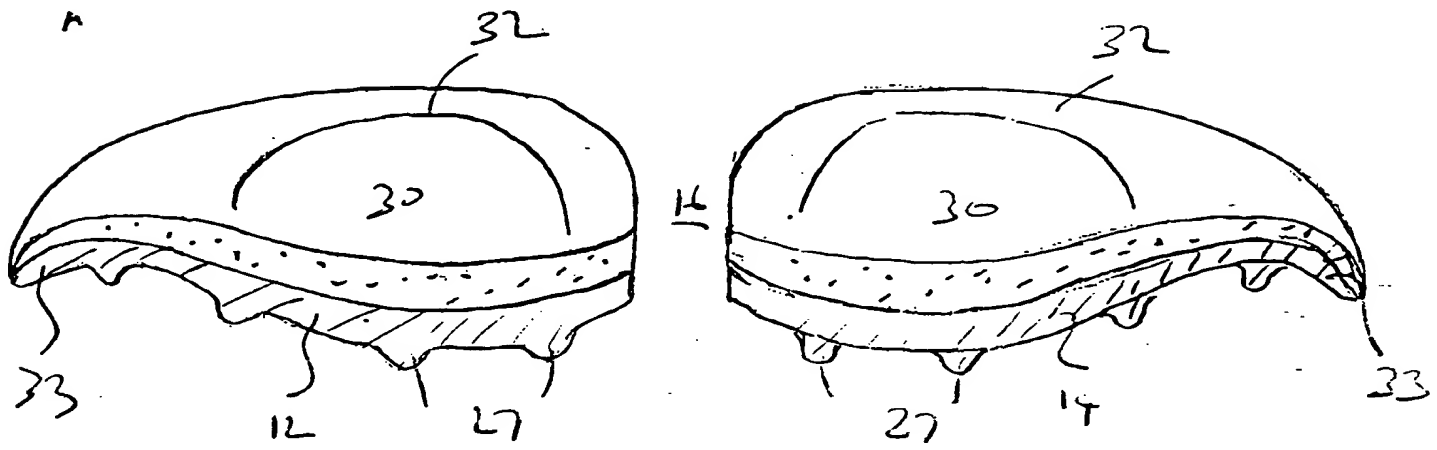


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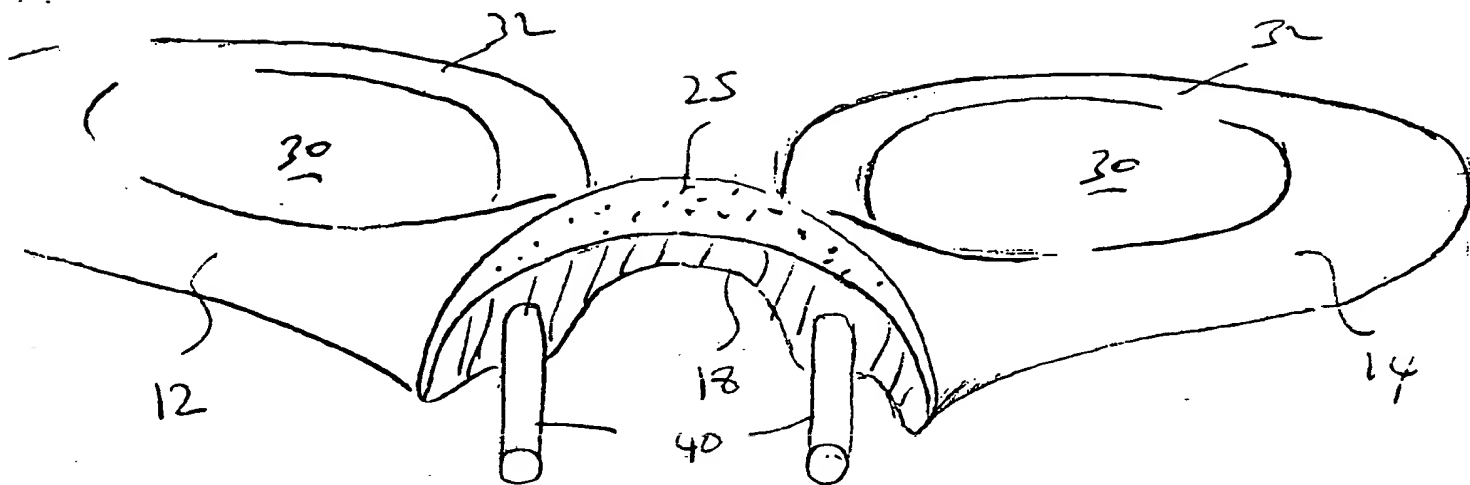


Fig 14

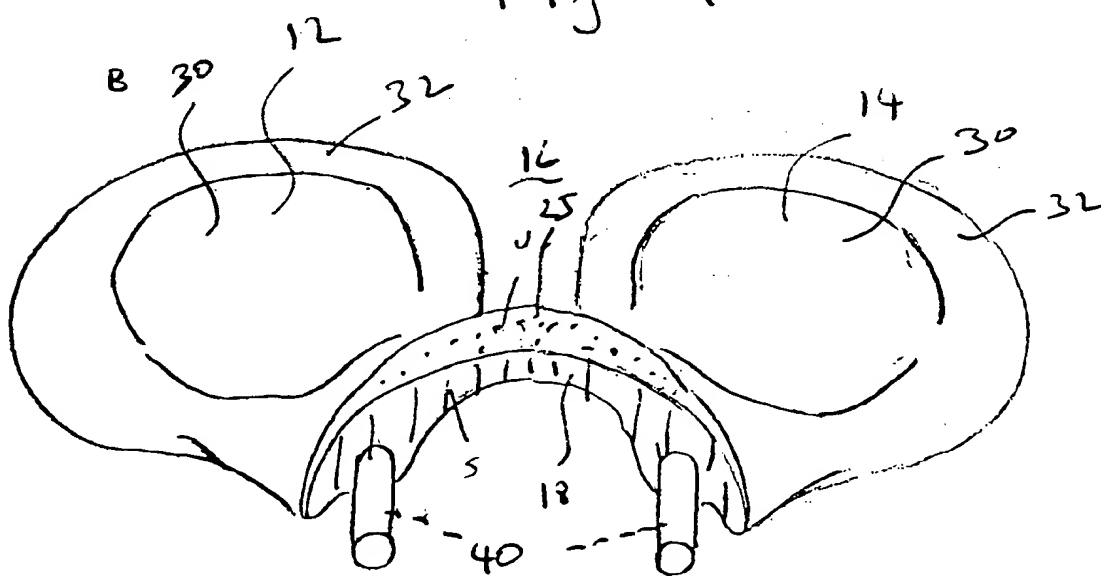
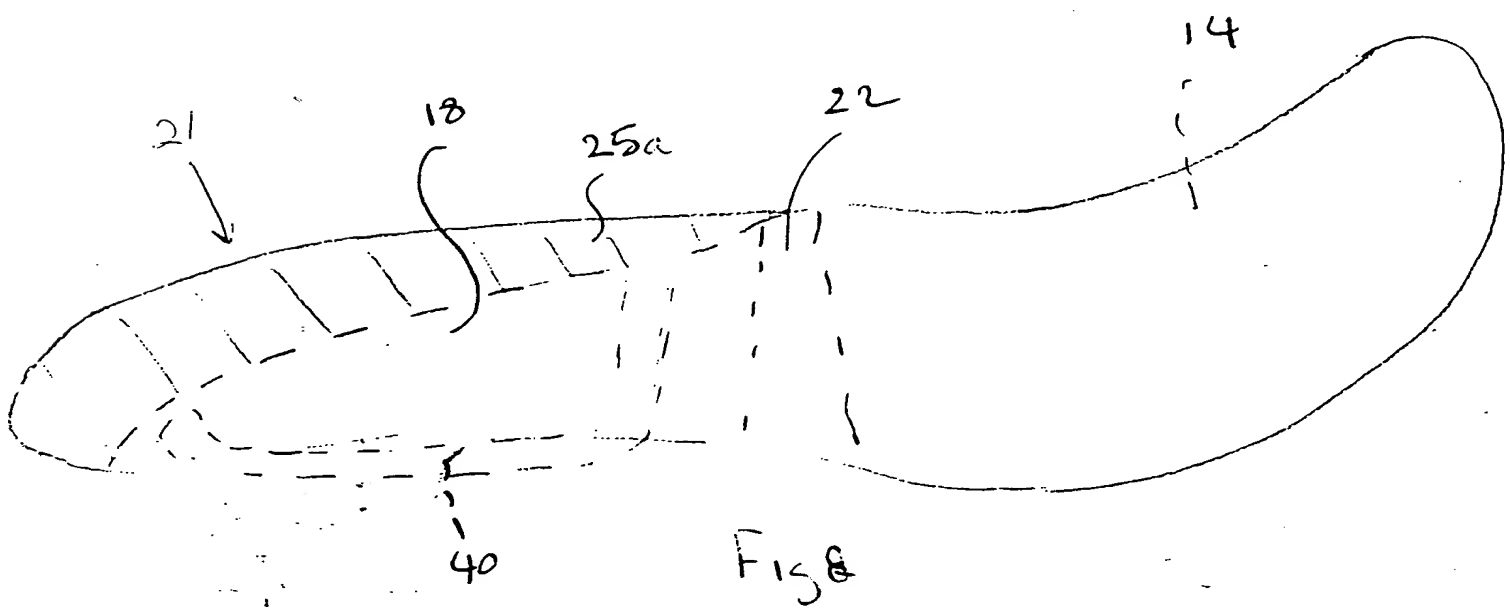
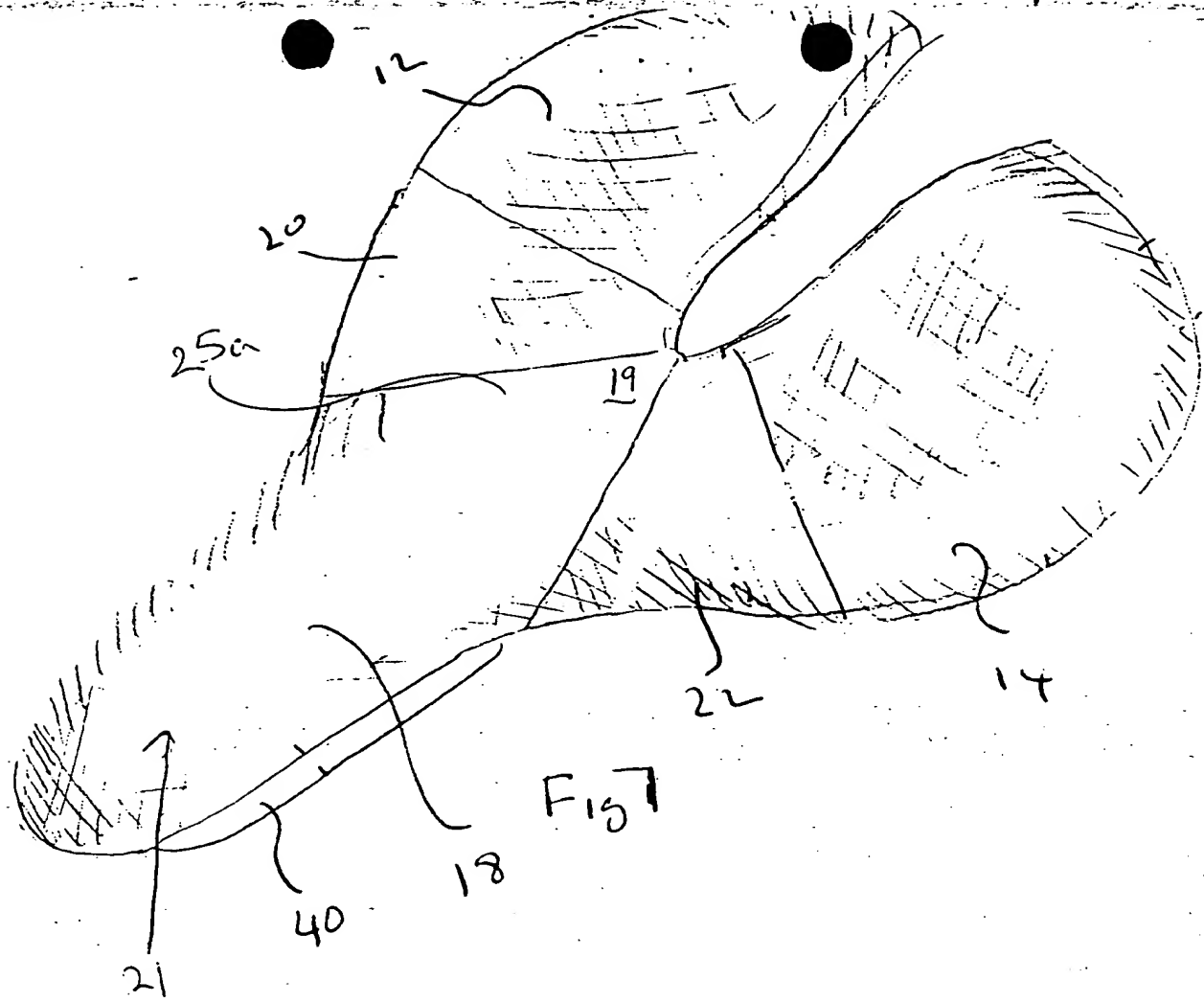
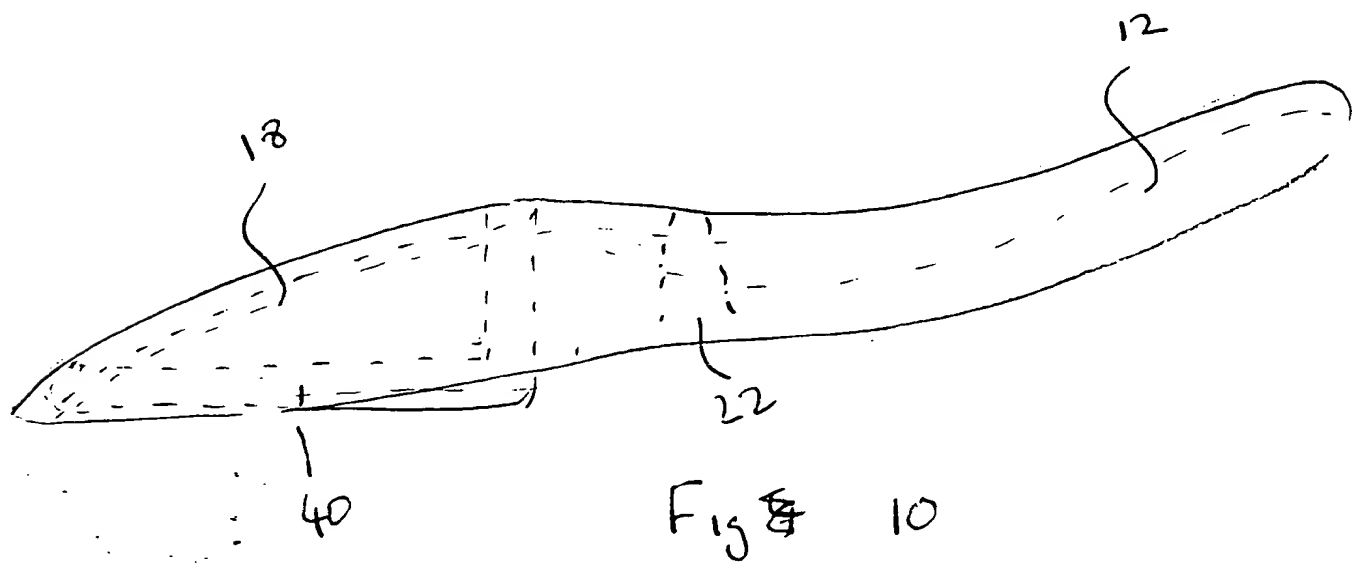
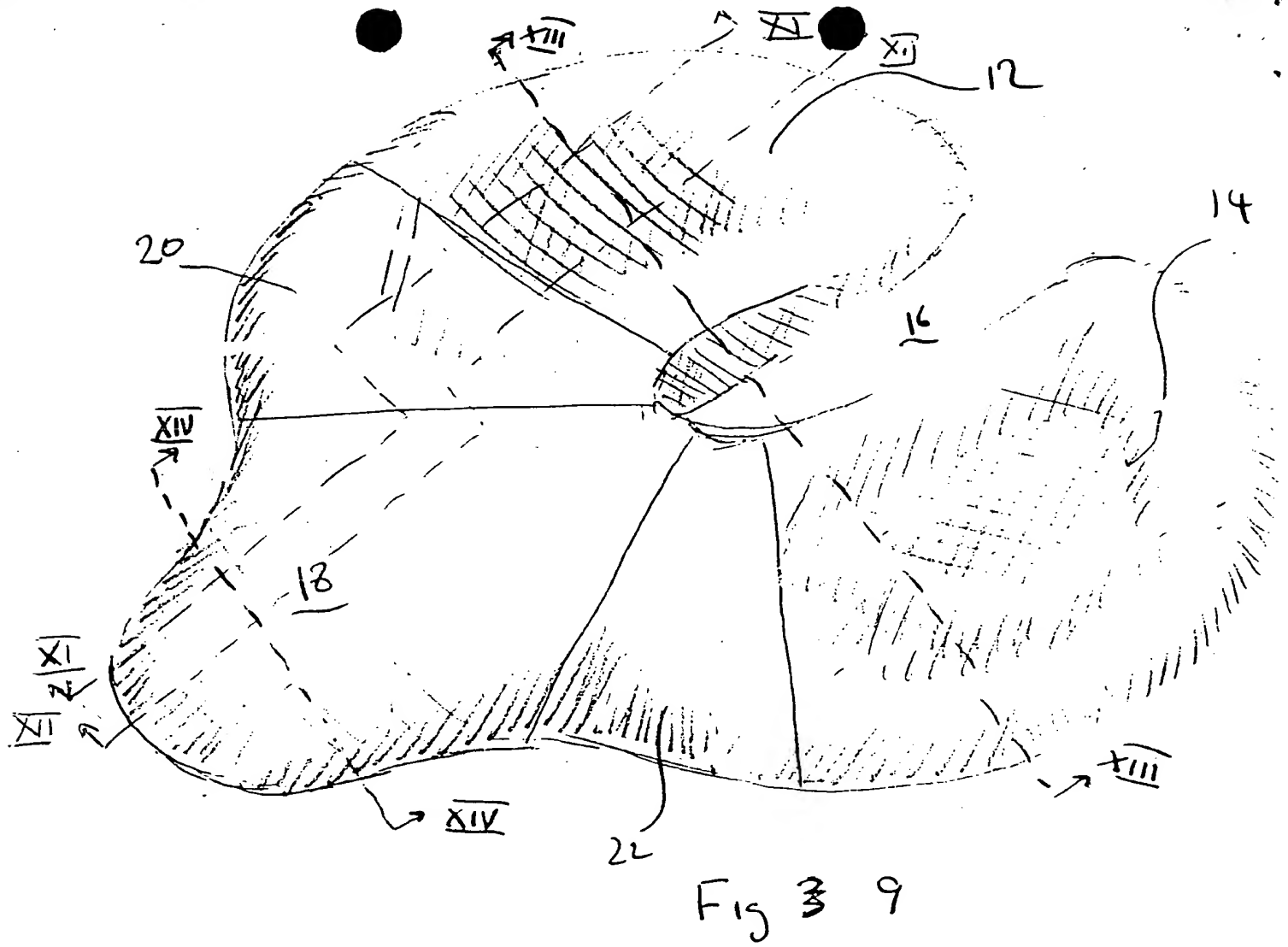
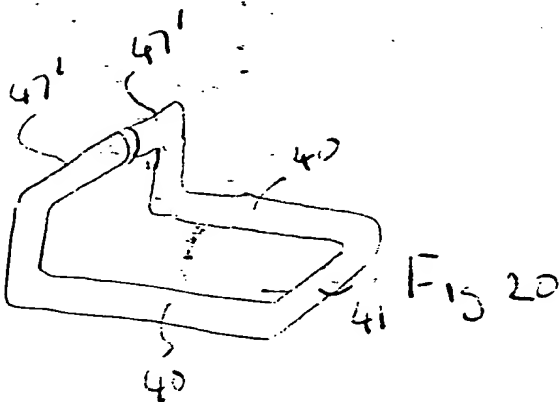
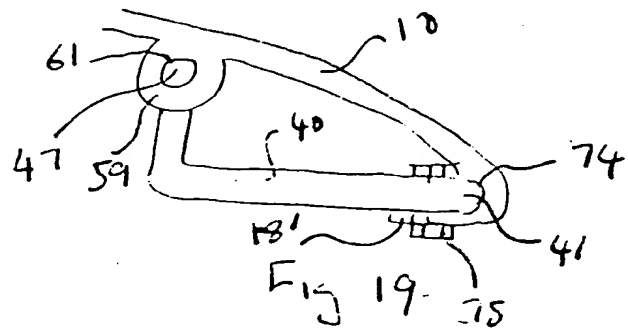
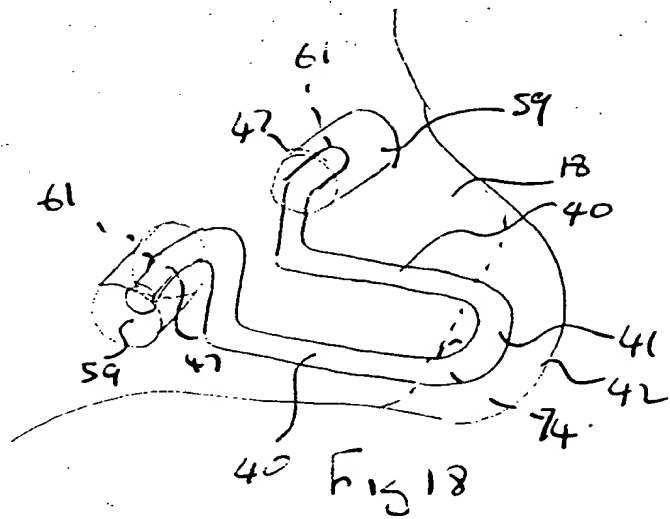
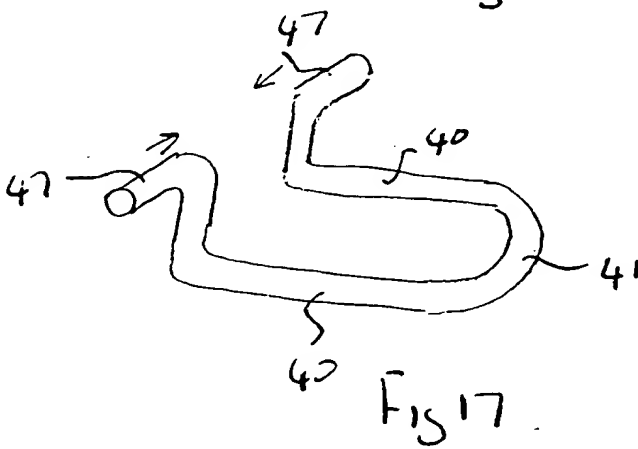
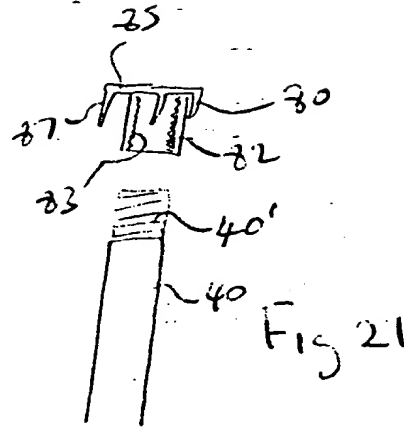
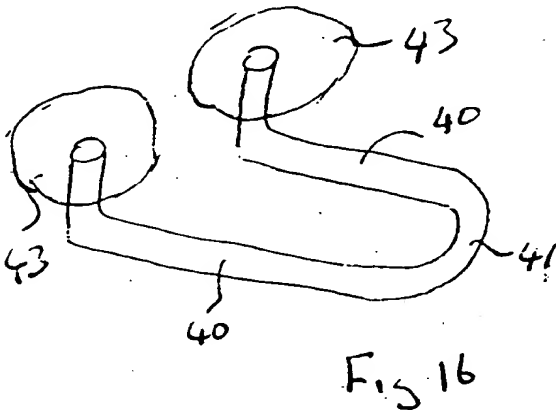
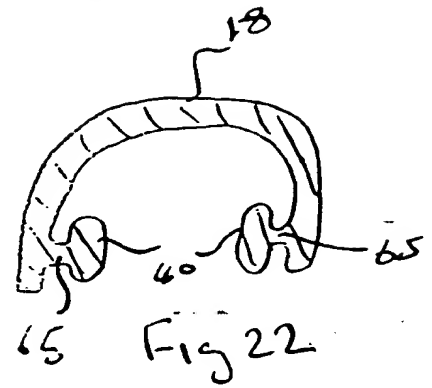
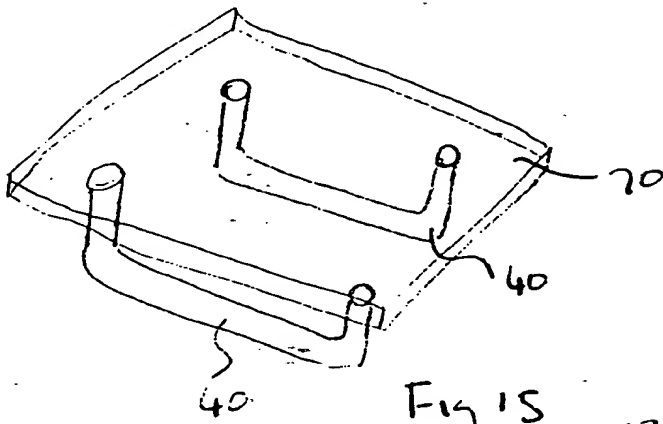


Fig 6







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